

# New Developments in FM Systems for Infants and Children

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# Technology Choices

- ▶ Current FM Technology
  - Transmitters
  - Receivers
- ▶ Using FM features for pediatric populations
  - Infants and children under 2 years
  - Preschool
  - Elementary School
  - Secondary School



# AAA HAT Guideline

## 5-Step Implementation Process

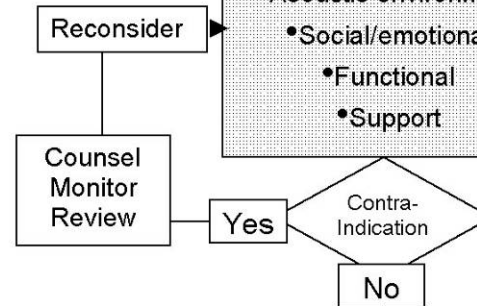
<http://www.audiology.org/resources/documentlibrary/Pages/HearingAssistanceTechnologies.aspx>

**Step 1. Potential Candidacy for HAT**  
Hearing Loss	Auditory Processing Deficit	Learning Disability
Auditory Neuropathy/Dys-synchrony	Language Deficit	
Attention Deficit	English Language Learner	



**Step 2. Considerations**  
[In and out of school]

- Acoustic environment
- Social/emotional
- Functional
- Support




**Step 3. Device Selection**

**Step 4. Fitting and Verification**

**Step 5. Implementation and Validation**

# General Device Considerations

- ▶ Ease of accessing FM program
    - Auto (EasyFM) / Manual / Start-up
  - ▶ Access to battery and ON/OFF with FM attached
  - ▶ Wear and tear with FM attached
    - How often does FM receiver get removed or replaced
  - ▶ Overall size with FM attached
  - ▶ Balance of primary talker (FM) to other talkers (HA)
- 

# Transmitter Technology

- ▶ Dynamic FM
  - Adaptive FM level
  - Noise processing
- ▶ FM Monitoring
  - Receiver Check
  - Sound Check of FM microphone
  - Datalogging
- ▶ Multi-Talker Networks
- ▶ Voice Activity Detection



# Dynamic FM

- ▶ Adaptive FM Advantage
  - FM level increases with increasing background noise level up to max of +15 dB FM Level over hearing aid microphone level
  - FM level begins to change when noise level exceeds 57 dB
  - Beginning FM level is still programmable



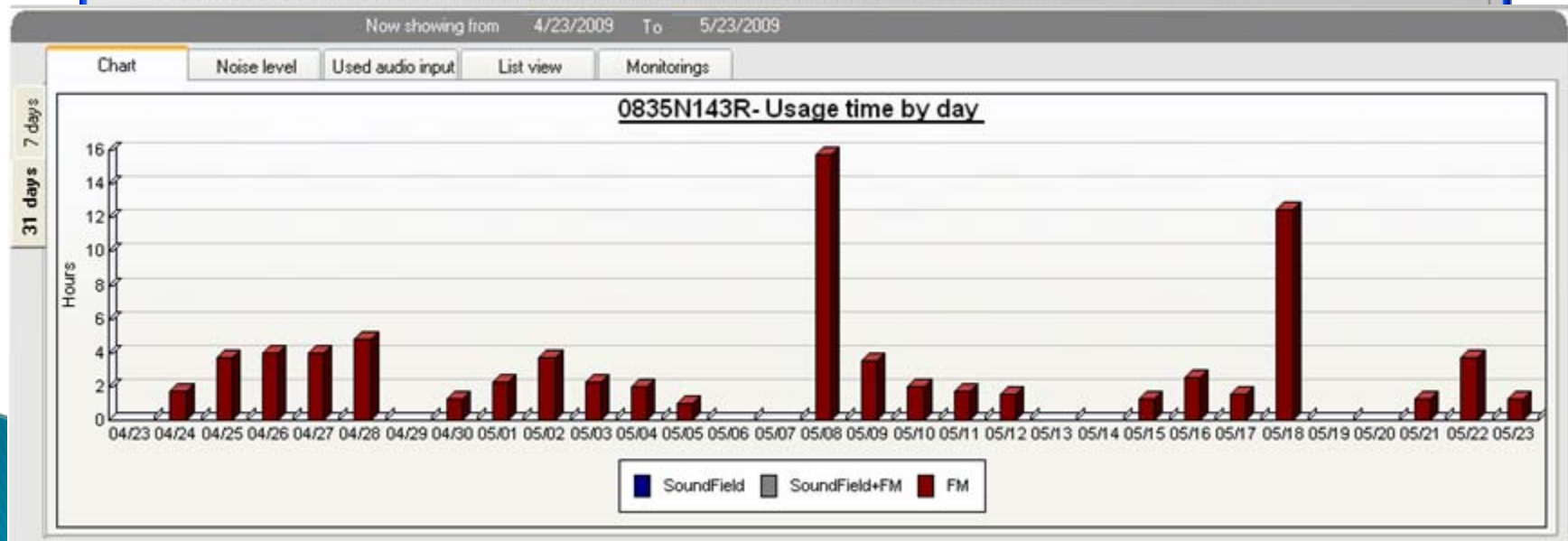
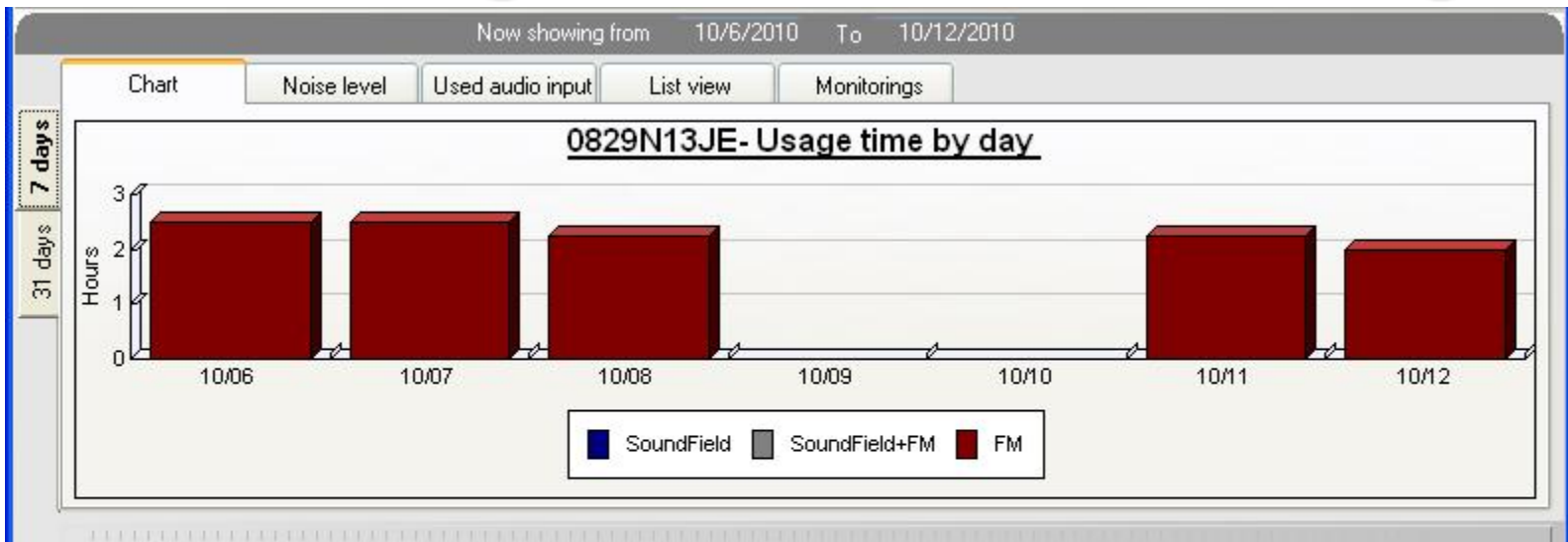
# Transmitter / Receiver Datalogging

- ▶ Transmitter Usage Time
- ▶ Noise Levels @ Transmitter
- ▶ Input Usage
  - iLapel / iBoom / Auxiliary input
- ▶ Records monitoring activities





# Monitoring Transmitter Usage





Now showing from 10/6/2010 To 10/12/2010

Chart

Noise level

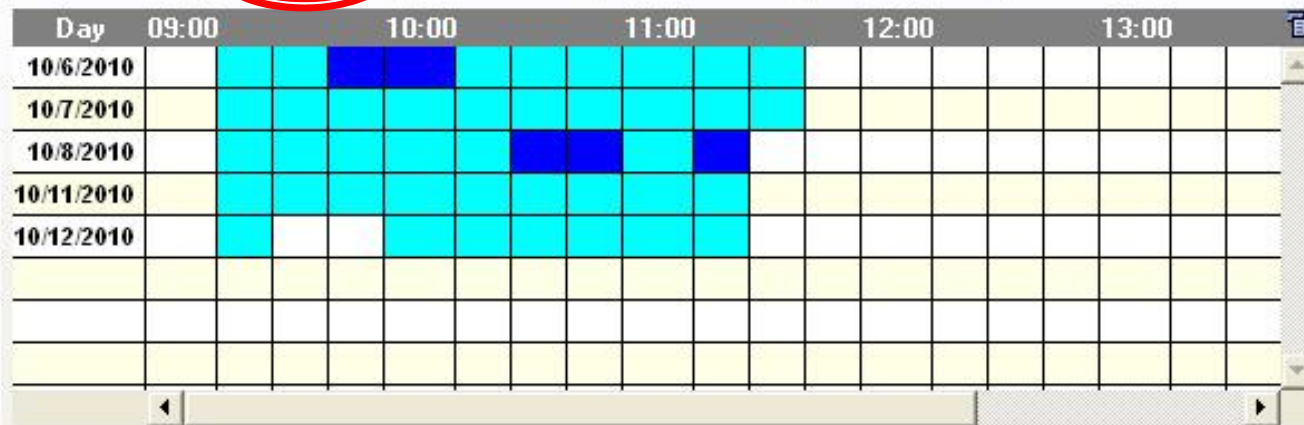
Used audio input



List view

Monitorings

7 days

31 days



-  Low ambient noise in the room < 65 dB SPL
-  High ambient noise in the room > 65 dB SPL

1/1/2008

10/12/2010

Now showing from 4/23/2009 To 5/23/2009

Chart

Noise level

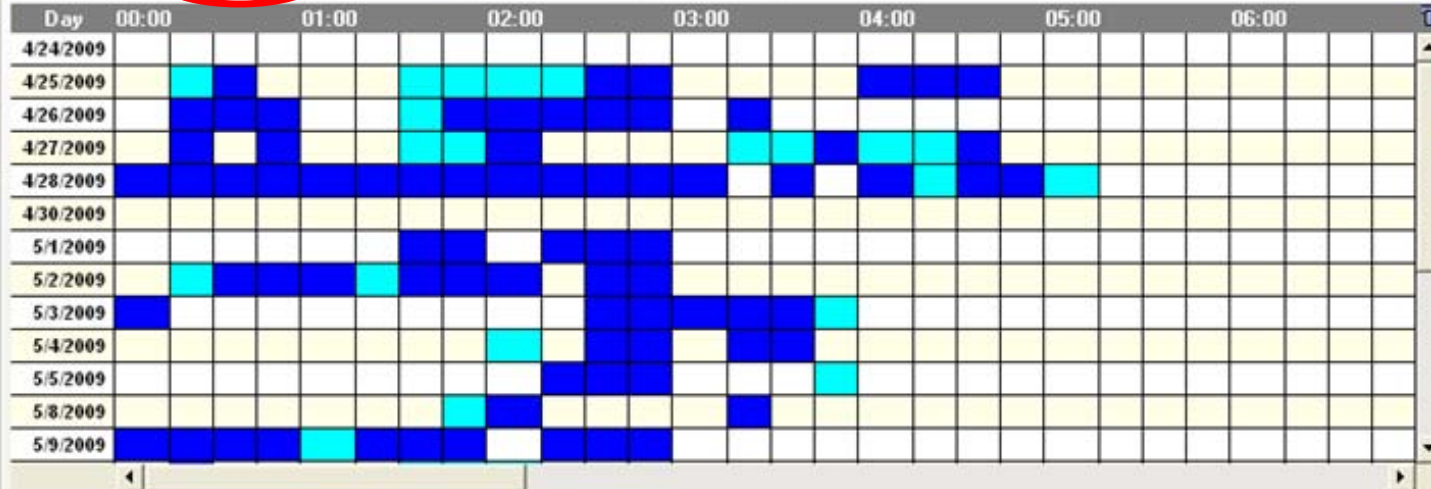
Used audio input



List view

Monitorings

7 days

31 days



-  Low ambient noise in the room < 65 dB SPL
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1/1/2008

5/23/2009

# Multi-Talker Networks

- ▶ Allows team teaching transmission
  - Inspiro to Inspiro
  - DynaMic to Inspiro
- ▶ Primary teacher / talker is maintained
- ▶ Requires coordination of talkers and activities



# FM microphone directionality

- ▶ iLapel microphone option has directional features
- ▶ Switchable directionality – SmartLink+ / Zoomlink+ / Amigo



# Universal FM Receivers

- ▶ Switchable between DAI-compatible HA models and manufacturers and CI
- ▶ Programmable / Adjustable FM Level



R2



DAI Boots



# Dedicated FM Receivers


- ▶ Semi-integrated into BTE case via battery door
- ▶ Smaller overall size when attached to BTE
- ▶ Programmable / Adjustable FM Level
- ▶ Usually Family-owned system



Combined  
HA+FM  
(R12)



# General Assumptions when using Ear-Level FM Receivers

- ▶ Gain/Output characteristics of system are determined by hearing instrument settings
  - ▶ Hearing instrument has been set for appropriate output and audibility with a variety of speech inputs
  - ▶ Hearing instrument adjustments are coordinated between dispensing audiologist and educational audiologist
- 



# Other FM Receiver Interfaces

- ▶ MyLink+
- ▶ Arc
- ▶ iCom
- ▶ iSense
- ▶ Dynamic SF





# General Candidacy Considerations

- ▶ **Acoustical Environment**
  - Noise / Distance / Reverberation
- ▶ **Social / Emotional Factors**
  - Family Support / Classroom Culture / Motivation / Self-Advocacy
- ▶ **Functional Factors**
  - Age / Communication Skills / Communication Environment
- ▶ **Support Factors**
  - Financial / Monitoring & Managing Equipment

# School / Clinical Collaboration

- ▶ Dispensing audiologist keeps educational audiologist informed when new hearing aids are fit
  - Appropriate battery doors & DAI shoes available
- ▶ Hearing aids may need programming to access FM input – who is responsible?
- ▶ Decisions about EasyFM / autoFM access are decided as a team
- ▶ School provides FM equipment for Dispensing Audiologist to verify FM OR Educational Audiologist verifies FM

# School / Clinical Collaboration

- ▶ Who provides teacher training and on-going monitoring?
- ▶ What happens if the hearing aids are not set appropriately for child and FM?
- ▶ What happens if the child's personal hearing aids are not functioning?




# FM Priorities for children under 2 years

- ▶ Monitoring functions
- ▶ Datalogging information
- ▶ Smallest FM receiver as possible
- ▶ Loss prevention
- ▶ EasyFM or AutoFM reduces switches needed
- ▶ Dedicated FM receiver with inspiro transmitter
- ▶ Training on appropriate environments for use



# FM Priorities for Preschool Age

- ▶ Monitoring functions
  - ▶ Datalogging information
  - ▶ Loss prevention
  - ▶ EasyFM or AutoFM reduces switches needed
  - ▶ School & Home use will determine best type of FM receiver combination
  - ▶ Team Teaching microphones must be considered carefully
  - ▶ Consider manually syncing in different pre-school learning modules / stations
- 

# Urban School Settings

- ▶ Dedicated Educational Audiology support
- ▶ High numbers of hearing impaired students in school system
  - FM system must be available even when child does not have functional personal hearing aids
  - Education district may choose to provide the entire Amplification System
    - Stock of hearing aids, universal FM receivers and FM transmitters which are all the same



# Rural School Settings

- ▶ 1 or 2 students with hearing–impairment in school system
- ▶ FM system depends on child having personal hearing aids that function
- ▶ Rural school settings typically need limited number of FM systems that stay with the same student over several grades
- ▶ Limited or no Educational Audiology support
  - Dispensing audiologist may take role of educational audiology consultant
  - No one in child’s school building has any familiarity with FM system monitoring / function



# FM Priorities for Primary Grades

- ▶ Monitoring functions are more critical in lower primary grades
- ▶ Consider needs for Multi-talkers versus Level-based instruction
- ▶ Adaptability with classroom soundfield systems, Smartboards



# FM Priorities Beyond Primary Grades

- ▶ Steps to maintain best chance of FM use into secondary grades
  - Evaluate classes where FM most needed
  - Minimal visibility of FM receiver itself
  - Minimal disruption of class flow (transportation of FM mic and ease of function)
- ▶ Ease of switching teachers & rooms makes ZoomLink+ / EasyLink+ or other lavalier transmitter-mic preferable
- ▶ iCom with MLxi or MyLink+



# Secondary Grades and Beyond!

- ▶ Transition planning begins ahead of time
- ▶ Consider iCom/FM receiver combination for a flexible combination to assist college students
  - Bilateral FM input with 1 FM receiver
  - Bluetooth for cell phone & iPod
  - Direct inputs for other devices
- ▶ ZoomLink+ for increased flexibility of use in and out of traditional lecture situations



# Secondary Grades and Beyond!

FM - GAP Access Planning | Phonak - life is on - Microsoft Internet Explorer provided by BTNRH (Proxy Enabled)

http://www.phonak.com/us/b2c/en/products/fm/gap.html

Convert Select

Favorites Web Slice Gallery

FM - GAP Access Planning | Phonak - life is on

PHONAK life is on

Hearing and Hearing Loss Products and Solutions Usage and Support

You are in: Home > Products and Solutions > FM > GAP Access Planning [Send to a friend](#)

## The New Interactive Guide to Access Planning

### Introducing GAP

Sponsored by Phonak, the interactive GAP Learning Guide was developed to help teens and young adults with hearing loss to better enable and empower themselves as they make significant life transitions. GAP is the first guide of its kind that is interactive and combines the wide spectrum of resource materials used to support self-advocacy for young people with hearing impairment.

Importantly, it was developed by a team of audiologists, deaf educators and professionals with hearing loss who understand the everyday challenges and work to develop strategies to address them.

We assume that teens and young adults likely receive a certain level of hearing assistance technology while in high school, but recognize that colleges or the workplace have gaps in providing the necessary support. The section called "MyGAP" provides teens and young adults with information about their rights as a person with hearing loss, available technology and how to choose what's best for their individual lifestyle needs. It also includes tips and scenarios on how to effectively communicate their needs to teachers, employers, etc.

GAP also contains information specifically for professionals such as teachers, college disability coordinators, vocational rehabilitation counselors, and employers who support teens and young adults. Additionally, it provides useful information for parents and caregivers.

### FM

- What is FM
- Transmitters
- Receivers
- CROSLink
- FM Accessories
- Classic FM
- GAP Access Planning**

### Support

- eSchoolDesk
- FM eLibrary
- FM FAQ

### Downloads

- Guide to Access Planning - GAP (ZIP, 20MB)



